LAWLER, METZGER & MILKMAN, LLC

2001 K STREET, NW
SUITE 802
WASHINGTON, D.C. 20006

GIL M. STROBEL
PHONE (202) 777-7728

PHONE (202) 777-7700
FACSIMILE (202) 777-7763

March 29, 2004

Via Electronic Filing

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

Re: *Written Ex Parte Presentation*:
IP-Enabled Services, WC Docket No. 04-36;
Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, CC Docket No. 02-33;
Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services, CC Docket No. 01-337;
Developing a Unified Intercarrier Compensation Regime, CC Docket No. 01-92;
Federal-State Joint Board on Universal Service, CC Docket No. 96-45

Dear Ms. Dortch:

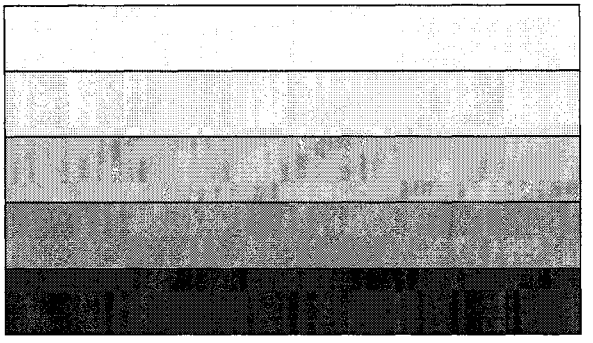
Attached is an MCI Public Policy Paper entitled ADAPTING FCC POLICYMAKING TO THE NETWORK LAYERS MODEL: A ROADMAP FOR FCC ACTION. Pursuant to the Commission's rules, 47 C.F.R. § 1.1206(b), this document is being provided to you for inclusion in the public record of the above-referenced proceedings.

Sincerely,

Gil M. Strobel

Attachment

cc: Scott Bergmann, Matthew Brill, Robert Cannon, Michelle Carey, Jeffrey Carlisle, Michael Carowitz, Renee Crittendon, William Dever, Jordan Goldstein, Daniel Gonzalez, William A. Kehoe, III, Christopher Libertelli, William Maher, Scott Marcus, Carol Mattey, Steven F. Morris, Thomas Navin, Brent Olson, Robert M. Pepper, Tamara Preiss, Jessica Rosenworcel, Donald K. Stockdale, Jr., Robert Tanner, Bryan Tramont



ADAPTING FCC POLICYMAKING TO THE NETWORK LAYERS MODEL

A Roadmap for FCC Action

An MCI Public Policy Paper

Richard S. Whitt
Senior Director for Global Policy and Planning
MCI
March 2004

ADAPTING FCC POLICYMAKING TO THE NETWORK LAYERS MODEL

Overview

The development of the Internet Protocol (IP) and the associated convergence of networks and services has fundamental implications for the policies of the Federal Communications Commission (FCC). The power of IP lies in part in the fact that it breaks the link between the service and the medium. Historically, FCC regulation has assumed that a particular service is tied to a particular medium (*e.g.*, voice telephony to copper and fiber wireline networks, television programming to the spectrum assigned to broadcasting). IP-based networks, however, allow applications or services to be carried on a variety of physical media. Network engineers have for some time used versions of a network-layers model to describe IP networks, with layers ranging from the physical (copper, fiber, etc.) at the bottom to content at the top. As a number of progressive thinkers have pointed out, a network-layers model can be an extremely useful tool for policymakers. As IP networks become ever more pervasive, policymakers will find that a layers approach to policy issues is preferable to traditional service-based regulation. In particular, a layers approach is better adapted to the networks of today, is flexible enough to accommodate the networks of the future, and will better serve policymakers in achieving the goals of competition, deregulation, innovation and the provision of services to all Americans.

This paper draws heavily on a December 2003 MCI white paper, entitled *A Horizontal Leap Forward*, which proposes a new public policy framework based on the network layers model.[1] Building on the foundation established by *Horizontal Leap*, MCI now focuses on the issues most relevant to the FCC, briefly describing a simplified layers model that MCI has developed for use by policymakers, along with a set of fundamental principles that should guide the FCC in future policymaking. The paper then describes the implications of the layers approach for specific FCC rulemakings, including the IP-Enabled Services proceeding, the Broadband Framework proceeding, the Broadband Dominance/Non-Dominance proceeding, intercarrier compensation, and the proceeding regarding Universal Service contribution mechanisms. The paper also suggests that the FCC develop a comprehensive framework for applying layers-based principles in future proceedings, and notes that legislative changes may be necessary to ensure that regulatory policies incorporate a layers-based approach and keep pace with changing dynamics in markets and technology.[2]

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[1] *See* A HORIZONTAL LEAP FORWARD: FORMULATING A NEW PUBLIC POLICY FRAMEWORK BASED ON THE NETWORK LAYERS MODEL, by Richard S. Whitt, Senior Director of Global Policy and Planning, MCI (March 2004), *available at*: <http://global.mci.com/about/publicpolicy/presentations/horizontallayerswhitepaper.pdf> (*Horizontal Leap*).

[2] *See* CODIFYING THE NETWORK LAYERS MODEL: MCI'S PROPOSAL FOR NEW FEDERAL LEGISLATION REFORMING U.S. COMMUNICATIONS LAW, by Richard S. Whitt, Senior Director for Global Policy and Planning, MCI (March 2004), *available at*: <http://global.mci.com/about/publicpolicy/presentations/layersmodelfederallegislation.pdf>.

From Silos to Layers

Historically, policymakers have viewed each communications service as inextricably tied to a particular underlying network technology. For instance, copper telephone lines carried voice telephony service, coaxial cable lines carried cable television service, and discrete bands of radio spectrum carried specific services (*e.g.*, broadcast television or radio services). As a result of this identity between a service and its underlying medium, a "silo" model of vertical regulation evolved, in which each service – and its associated network and technology – was regulated separately from other services. Examples of particular silos include wireline telephony service, wireless telephony service, cable television service, broadcast television and radio service, and satellite broadcast service. The titles of the Communications Act of 1934, as amended, generally reflect this silo model.

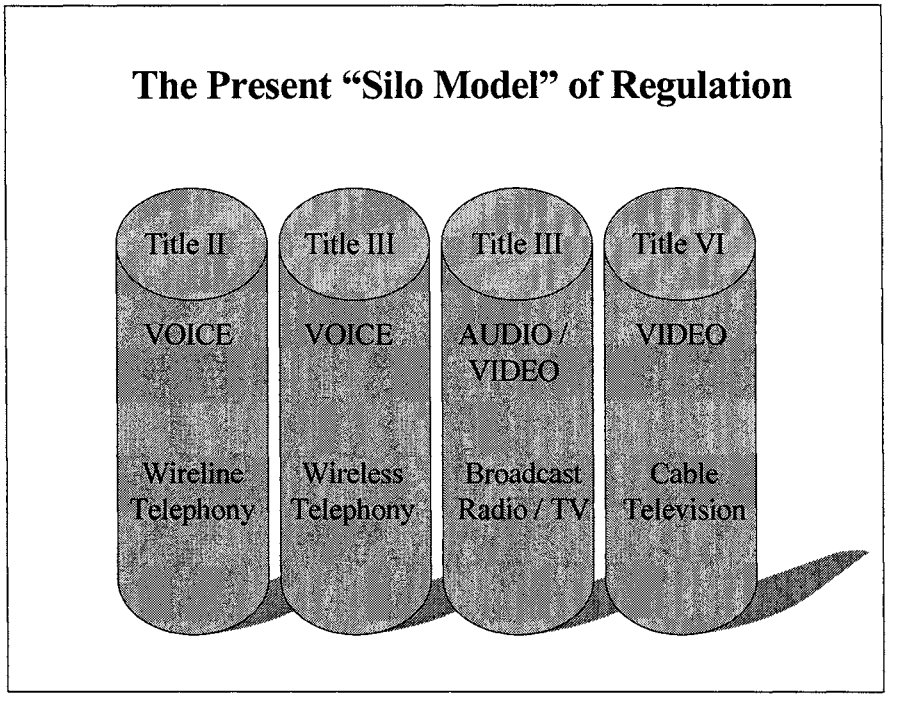

Figure 1

Although the silo model proved useful when particular services were uniquely associated with particular networks, the advent of IP has created fundamental changes that the silo model is ill-equipped to handle. With the development and proliferation of of IP, multiple services can now be provided over a single medium or network, and a single service can be provided over multiple media or networks. For example, an MP3 file sharing application can be accessed over coaxial cable, twisted copper telephone lines, or satellite spectrum without any reconfiguration of the application or content to

accommodate the physical network being used.[3] This ability to provide the same service or application over a variety of networks is a fundamental feature of IP.

IP networks are designed to consist of modular layers. By assigning particular functions to different layers, with standardized interfaces between layers, engineers can make changes to one layer without affecting others, as long as the interfaces between the layers remain constant. This modularity, in turn, allows engineers to create readily new products and services by implementing modifications at the appropriate layer (*e.g.*, the applications or content/transactions layer), rather than having to rework the entire set of protocols across all layers.[4] Because there are minimal specifications of protocols in the logical layer, supporting a wide range of transport networks below and a wide range of applications above, IP networks have been described as having an "hourglass" shape.[5] This hourglass structure facilitates the convergence of services by permitting communications between disparate physical networks (*e.g.*, coaxial cable and satellite), and by allowing a diverse array of applications and content to ride those disparate networks.[6]

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[3] *See* figure 2, *infra* at 4.

[4] For a more detailed description of the evolution from silos-based networks to layers-based networks, *see Horizontal Leap* at 2-13.

[5] *See* Michael L. Katz, *Thoughts on the Implications of Technological Change for Telecommunications Policy*, in TRANSITION TO AN IP ENVIRONMENT: A REPORT OF THE FIFTEENTH ANNUAL ASPEN INSTITUTE CONFERENCE ON TELECOMMUNICATIONS POLICY at 25 (2001), *available at*: <http://www.aspeninstitute.org/aspeninstitute/files/Img/pdf/transition_bk.pdf> (*Implications of Technological Change*).

[6] *See Implications of Technological Change* at 25-27 (explaining that the Internet's "hourglass" architecture permits a wide range of content and applications to evolve above an intermediate protocol layer, and a wide range of transport networks to evolve below that layer).

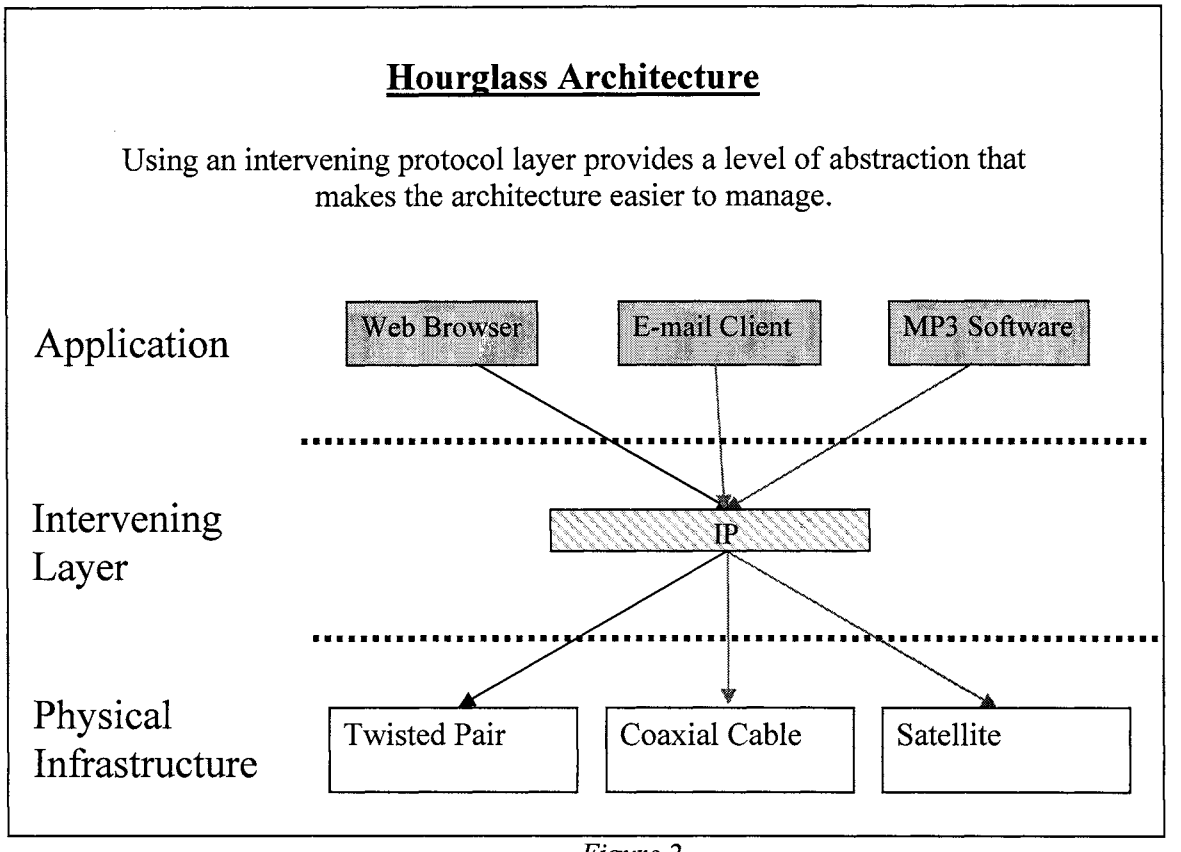

Figure 2

As convergence becomes a reality, the current regulatory framework is becoming less relevant, and may, in fact, artificially distort the business decisions of competitors. As a number of scholars and experts have suggested, policymaking at the FCC would benefit greatly if the "silos" approach were replaced by a layers-based approach better suited for IP networks.[7]

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[7] *See Horizontal Leap* at 23-28 (summarizing much of the scholarship on a layers-based approach to regulation); *see also, e.g., Implications of Technological Change;* Kevin Werbach, *A Layered Model for Internet Policy*, 1 J. ON TELECOMM. & HIGH TECH. L. 37 (2002) (*Werbach*); Douglas C. Sicker, *Further Defining a Layered Model for Telecommunications Policy*, Telecommunications Policy Research Conference (TPRC) Paper (2002), *available at*: <http://intel.si.umich.edu/tprc/papers/2002/95/ LayeredTelecomPolicy.pdf>; Rob Frieden, *Adjusting the Horizontal and Vertical in Telecommunications Regulation: A Comparison of the Traditional and a New Layered Approach*, 55 FED. COMM. L.J. 207 (2003); Robert M. Entman, TRANSITION TO AN IP ENVIRONMENT: A REPORT OF THE FIFTEENTH ANNUAL ASPEN INSTITUTE CONFERENCE ON TELECOMMUNICATIONS POLICY (2001), *supra* note 5; Lawrence B. Solum and Minn Chung, *The Layers Principle: Internet Architecture and the Law* (University of San Diego School of Law, Public Law and Legal Theory Research Paper No. 55) (2003), *available at*: <http://ssrn.com/abstract=416263>; Robert Cannon, *The Legacy of the Federal Communications Commission's Computer Inquires*, 55 FED. COMM. L.J. 167

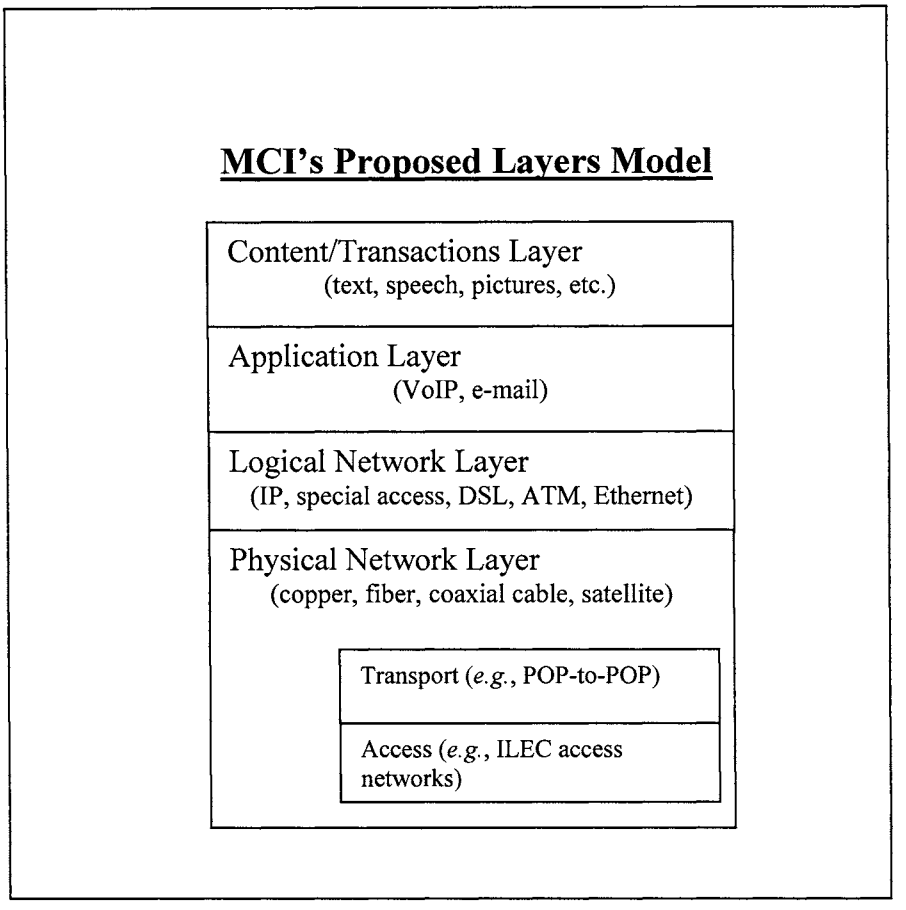

Figure 3

The MCI layers model contains fewer layers than the models used by engineers, in order to enable the FCC to focus on the conceptual layers most relevant to its policymaking jurisdiction.[8]

Layers Approach Under the Communications Act

The Communications Act is flexible enough to allow the FCC to begin the process of incorporating the layers approach into its policymaking. In fact, the FCC has already adopted certain policies and regulations that are consistent with a layers-informed framework. As many scholars have noted, for example, the distinctions between enhanced services and basic services (adopted in the *Computer II* proceeding in 1980),[9] and between telecommunications services and information services (codified as part of

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(2003); Craig McTaggert, *A Layered Approach to Internet Legal Analysis* (2002), *available at*: <http://www.innovationlaw.org/cm/ilg2002/reading/layered1.pdf> (*McTaggert*).

[8] *See Horizontal Leap* at 26.

[9] *Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry)*, Final Decision, 77 F.C.C.2d 384 (1980) (*Computer II*).

the 1996 amendments to the Act),[10] were based on a recognition that certain computer-related applications "rode" on underlying transmission facilities, and should be treated differently from these underlying facilities.[11] Similarly, in section 706 of the Act, Congress recognized the independence of applications from underlying networks, defining "advanced telecommunications capability" as consisting of the ability of users to originate and receive a panoply of "voice, data, graphics, and video" applications and services, "without regard to any transmission media or technology."[12] This paper suggests other steps the FCC can take, both in the near term with respect to ongoing proceedings, and in the longer term, to adapt its regulations more closely to an IP-based communications landscape where the traditional boundaries between services are increasingly irrelevant.

Implementing a Layers-Based Approach

The FCC can use the layers model and principles described below to analyze public policy issues. As an initial step, the FCC should begin using the layers principles to inform policy decisions in specific rulemaking proceedings that are underway. As a second step, the FCC should develop a comprehensive framework based on the layers principles, and use that framework to guide its decision-making in future proceedings. Finally, the FCC should assist Congress in formulating legislative changes that may be necessary to ensure that regulatory policies are consistent with the layers approach and keep pace with market and technology changes.

A layers-based approach to policymaking will assist the Commission in developing narrowly-tailored solutions that focus on the layer or layers implicated by the specific issues under review. For instance, certain firms continue to exercise bottleneck control over the last-mile physical and logical links needed for access to end-user customers.[13] A layers-based approach would allow the FCC to target economic regulations to the access portions of the logical and/or physical layers, while refraining from regulating the applications and content that are transmitted over those logical and physical layers.

In applying a layers-based approach, the FCC should adhere as closely as possible to the following key principles:

Respect the integrity of the layers. The FCC should respect the integrity of IP layers by regulating only the layer that is causing a particular problem, or by regulating as close to that layer as possible.[14]

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[10] 47 U.S.C. §§ 153(20) & (46).

[11] *See Horizontal Leap* at 3-6, 14.

[12] Section 706(c)(1) of the Telecommunications Act of 1996, Pub. L. 104-104, 110 Stat. 56 (1996), reproduced in the notes under 47 U.S.C. § 157; *see Horizontal Leap* at 14.

[13] By contrast, long-haul telecommunications transport links used by interexchange carriers are available from numerous competing suppliers.

[14] *See Horizontal Leap* at 27-29.

Assess market power separately for each layer. As noted, market power remains concentrated primarily in the physical and logical network access layers. The FCC should regulate those layers to the extent necessary to prevent the abuse of market power, by, for example, ensuring that entities without market power have access to bottleneck facilities.[15]

Do not allow a company with market power at a lower layer to leverage that power to harm competition in markets that involve upper layers. In an IP-based environment, the proliferation and survival of innovative applications, services, and content depend on the ability of those providers to obtain access to lower layers, including the physical and logical layers. The FCC has long recognized the need to safeguard against the potential for a carrier with market power in an upstream market to leverage its power to harm competition in a downstream market.[16] Similarly, when a carrier has market power in one layer of an IP-based network (*e.g.*, the physical or logical layer), the FCC should safeguard against the potential for that carrier to leverage its market power to harm competition in one or more higher layers (*e.g.*, the application and/or content layers).

Do not regulate where it is unnecessary. The FCC should impose economic regulation only with respect to layer(s) where providers have market power, leaving the remaining layers free from unnecessary regulatory constraints. The FCC implicitly followed this principle in the *LEC Classification Order* when it decided to treat incumbent LECs as non-dominant in the provision of interLATA services, including in-region services, subject to specific safeguards.[17]

Keep the interfaces between layers open. A key aspect of IP networks' modular architecture is that standardized interfaces exist between layers, allowing each layer to provide "a well-defined set of services to the layers above it."[18] It is critical that these interfaces remain open so that firms do not restrict access to the layers they control.

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[15] *See, e.g., Computer II* at ¶ 229 (requiring carriers with market power to provide basic transmission facilities to all enhanced services providers on an equal basis as a means of constraining the "potential for abuse of . . . market power through controlling access to and use of the underlying transmission facilities in a discriminatory and anticompetitive manner").

[16] *See, e.g., Regulatory Treatment of LEC Provision of Interexchange Services Originating in the LEC's Local Exchange Area and Policy and Rules Concerning the Interstate, Interexchange Marketplace,* 12 FCC Rcd 15756 (1997) (*LEC Classification Order*); *Computer II.*

[17] *LEC Classification Order*; *see also Computer II* (allowing dominant carriers to provide enhanced services subject to specific safeguards).

[18] Ashish Shah, Douglas C. Sicker, and Dale N. Hatfield, *Thinking About Openness in the Telecommunications Policy Context*, TPRC Paper, at 13 (2003), *available at*: <http://intel.si.umich.edu/tprc/papers/2003/244/openness2.pdf>.

Open interfaces help prevent companies that have control of lower layers from hindering or preventing competition for services or applications at higher layers.[19]

Step 1: Applying a Layers-Based Approach to Policy Issues Currently Before the Commission

The FCC should develop a national policy of "unregulation" governing IP-based applications and services. The Internet is a global network of networks that crosses state and national boundaries.[20] IP-based services provided over the Internet therefore are inherently interstate.[21] Consequently a national policy is warranted for both social and economic regulation of such services.[22]

As discussed below, the FCC should focus any economic regulation on bottlenecks in the physical and logical layers. Further, the FCC should seek to harness the power of new IP networks to advance social goals, while ensuring that social regulations designed for circuit-switched networks do not hamper the development of IP-based services. A layers-based approach would have implications in a wide range of matters currently before the Commission, including issues related to VoIP and other IP-enabled services, incumbent LEC broadband services, intercarrier compensation, universal service, retail rate regulation, and social policies such as rules regarding the Communications Assistance for Law Enforcement Act (CALEA), emergency services and access for persons with disabilities.

IP-Enabled Services Proceeding. The FCC has issued a Notice of Proposed Rulemaking examining the various legal and regulatory issues surrounding IP-enabled services, including, but not limited to, VoIP.[23] As part of the Notice, the FCC invites comment on the applicability of a layers-based approach to categorizing and regulating IP-enabled services, and asked how the relevant layers should be defined.[24] As the Commission suggests in the NPRM, a layers-based approach to both economic regulation and social policies for these services is likely to be useful because many IP-based services are applications that "ride" on broadband transmission facilities.[25]

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[19] *Werbach* at 65-66.

[20] *See IP-Enabled Services*, WC Docket No. 04-36, Notice of Proposed Rulemaking, FCC 04-28, ¶¶ 1, 4 (rel. March 10, 2004) (*IP-Enabled Services NPRM*); *Implications of Technological Change* at 36-37; *McTaggart* at 1; *Horizontal Leap* at 57-58.

[21] *See, e.g., Petition for Declaratory Ruling that pulver.com's Free World Dialup is Neither Telecommunications Nor a Telecommunications Service*, Memorandum Opinion and Order, 19 FCC Rcd 3332, ¶¶ 4, 20-22 (2004) (FCC 04-27) (*Pulver*).

[22] *See id.*, ¶¶ 15-25.

[23] *IP-Enabled Services NPRM.*

[24] *Id.*, ¶ 37.

[25] *See id.*, ¶ 1 n.1 (noting that the term "IP-enabled services" includes "applications relying on the Internet Protocol family."); *id.* ¶ 37 (distinguishing between regulations applied to transmission facilities, communications protocols and applications).

In the NPRM, the FCC seeks comment on whether economic regulation of IP-enabled services is appropriate.[26] Economic regulation should be limited to those aspects of physical/logical network layers where incumbent LECs or other providers wield market power.[27] If the FCC ensures that companies with market power with respect to the physical and logical network layers furnish non-discriminatory access to competing providers of IP-enabled services, then VoIP and other IP-enabled services will flourish.

The FCC also seeks comment on whether and how to apply social regulations, such as public safety requirements and access to VoIP and other IP-enabled services by persons with disabilities.[28] Social regulations, in contrast to economic regulation, may in some cases be considered more appropriately at the application level. Traditionally, the FCC has addressed social issues, such as consumer welfare, safety and accessibility, through regulation of telecommunications service providers. For instance, CALEA requires telecommunications carriers to ensure that their equipment, facilities, and services are able to comply with authorized electronic surveillance.[29] Obligations regarding emergency services (such as 911 capability) and access for persons with disabilities likewise focus on providers of telecommunications services. As the FCC recognizes, however, a layers-based approach to regulation may require the Commission to re-think this traditional paradigm of applying certain regulations only to telecommunications carriers, particularly if VoIP and other applications provided over broadband are classified as information services.[30]

Assuming that social regulations, such as access to emergency services, should be imposed on IP-enabled services, the Commission inquires about technical or economic impediments that should be considered.[31] Fundamental differences between IP networks and circuit-switched networks make it unlikely that issues related to access to emergency services and other social regulation requirements can be solved by simple overlays to the existing network solutions. The FCC might therefore conclude that VoIP providers have a general obligation to comply with social welfare requirements, but refrain from imposing any particular technical solutions. Instead, the FCC should empower the industry to devise and implement new ways to protect consumers and address public

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[26] *Id.*, ¶ 74.

[27] As the FCC noted, "[u]nder a layered model, a provider's ownership of bottleneck facilities might warrant economic regulation of the facilities 'layer' but not of the applications that traverse those facilities." *Id.*, ¶ 37.

[28] *Id.*, ¶¶ 48, 53, 58.

[29] 47 U.S.C. § 1002.

[30] *See IP-Enabled Services NPRM* ¶ 45; *see also Pulver*, ¶ 8 n.24 (recognizing that classifying services as information services may have implications for public safety and consumer welfare regulations).

[31] *IP-Enabled Services NPRM*, ¶ 48.

interest concerns with respect to homeland security, 911, and similar issues.[32] This approach would allow the FCC to achieve the public interest benefits of social regulations without imposing potentially crippling technical mandates on new technologies, services or applications.[33]

Broadband Framework Proceeding. In this proceeding, the FCC sought comment on the appropriate regulatory treatment for incumbent LEC-provided DSL services that are bundled with information services and provided to end-user customers as broadband Internet access.[34] A layers-based analysis would focus on whether incumbent LECs have market power with respect to the physical and logical network layers. Assuming that incumbent LECs continue to possess market power with respect to those last-mile facilities, the FCC would regulate at the logical and/or physical layers to prevent the incumbent LECs from leveraging their power in one layer (*i.e.,* the physical or logical layer, including DSL) to harm competition in another layer (*e.g.,* the application layer, including information services). The risk of anticompetitive behavior can be reduced by ensuring that providers of applications and content (such as ISPs) have access to the physical and logical layers provided by incumbent LECs. By contrast, the applications and content provided by Internet access service firms – including, of course, the incumbent LECs – would not be regulated, a result that today is achieved by classifying those layers as non-regulated "information services." Restricting regulation to the logical and/or physical layers, while refraining from regulating at the higher layers where no firm currently has market power, would foster continued competition and innovation in the applications and content layers that ride on the physical network.

Broadband Dominance/Non-Dominance Proceeding. In this proceeding, the FCC sought comment on the regulatory safeguards and obligations, if any, that should apply when a carrier that is dominant in the provision of traditional local exchange and exchange access services provides broadband services, including ATM, Frame Relay, and DSL services.[35] For this proceeding, a slightly more refined version of the layers model could be used, as ATM and Frame Relay services provided by competitive carriers such as MCI depend on special access services provided by incumbent LECs. In the simplified model shown on page 5 above, special access, ATM and Frame Relay all reside in the logical layer. Using this model, the FCC might conclude that incumbent LECs have market power in the provision of ATM and Frame Relay as well as special

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[32] *See, e.g., id.*, ¶ 59 (seeking comment on whether the advent of IP-enabled services will improve traditional services designed to ensure access by persons with disabilities).

[33] *Id.*, ¶ 53 (expressing concern about imposing technical mandates in the early stages of new, fast-evolving services).

[34] *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, Notice of Proposed Rulemaking, 17 FCC Rcd 3019 (2002) (*Broadband Framework NPRM*).

[35] *Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services*, Notice of Proposed Rulemaking, 16 FCC Rcd 22745 (2001) (*Broadband Dominance/Non-Dominance NPRM*).

access. Alternatively, the FCC might use a more refined approach to conclude that regulating an incumbent LEC's provision of special access (such as by adopting special access metrics, grooming requirements and separate affiliate requirements) would provide a sufficient safeguard to allow non-dominant treatment of incumbent LEC ATM and Frame Relay services.[36]

Intercarrier Compensation Proceeding. In this proceeding, the FCC sought comment on its existing intercarrier compensation rules and on the feasibility of adopting a unified bill-and-keep approach to intercarrier compensation.[37] As the FCC noted, the current intercarrier compensation regulations "treat different types of carriers and different types of services disparately, even though there may be no significant differences in the costs among carriers or services."[38] A layers-based approach would be consistent with efforts already underway to correct anomalies in the current regulatory scheme by moving to a bill-and-keep system to cover virtually all intercarrier compensation arrangements, without regard to outmoded traditional distinctions based on the jurisdictional nature of the traffic or the technology being used. As noted above, distinctions between interstate and intrastate (and the concomitant distinction between federal and state jurisdiction) have little meaning in an IP-centric world. Accordingly, there should be a single, federal, intercarrier compensation policy that applies to all communications traffic and networks and extends to the IP world as well. Under a layers-based approach, carriers would be compensated by their subscribers for the use of their networks, regardless of the type of physical network employed (*e.g.,* coaxial cable, copper, or fiber), the type of service being provided over the network (*e.g.*, voice, video, or data), or the type of carrier involved (*e.g.*, interexchange carrier, incumbent LEC, competitive LEC, or wireless).[39]

Universal Service Contribution Reform Proceeding. Carriers currently contribute to the federal universal service fund based on their end-user revenues derived from the provision of interstate telecommunications services. The FCC has sought comment on whether it should adopt a new contribution methodology, such as a methodology that assesses contributions on the basis of connections, rather than revenues.[40] A layers-based approach would lead policymakers to assess contributions on a per-connection basis as a conceptual matter, and to focus on assessing contributions at only one layer of the network (*i.e.,* the physical/logical layer). Since a "connection" can

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[36] *See* letter from Richard S. Whitt, MCI, to Michelle Carey, FCC, attached to letter from Gil M. Strobel to Marlene H. Dortch, CC Docket Nos. 01-337 and 01-321, WC Docket No. 02-112, at 3-6 (Jan. 16, 2004).

[37] *Developing a Unified Intercarrier Compensation Regime*, Notice of Proposed Rulemaking, 16 FCC Rcd 9610 (2001) (*Intercarrier Compensation NPRM*).

[38] *Id.* ¶ 5.

[39] Where both parties are unregulated entities, market-based arrangements should continue to govern compensation.

[40] *Federal-State Joint Board on Universal Service,* Further Notice of Proposed Rulemaking, 17 FCC Rcd 3752, ¶¶ 34-83 (2002).

be any physical connection to a public network without regard to jurisdiction or medium (*e.g.*, wireless or wireline), a connections-based assessment methodology would provide a funding base that is consistent with the convergence of applications and services provided over IP-based networks. Contributions therefore should be assessed for each last-mile connection to the physical network, regardless of the applications or services being provided over those connections.

Retail Rate Regulation. A layers-based approach also has implications for retail rate regulation of services provided over IP. Rate regulations should apply only to layers where there are concerns about market power. Accordingly, there should be no need to regulate rates, terms, or conditions for VoIP or other IP-based applications, as long as the FCC regulates the underlying physical and/or logical layers where market power exists. Appropriate regulation of these lower layers would eliminate the need for regulation of rates at the higher level content and application layers.

Step 2: Comprehensive Framework to be Used in Future Proceedings

In addition to applying the layers-based approach in individual proceedings, as described above, the FCC should consider developing a comprehensive policy framework that incorporates the principles of the layers-based approach. Such a policy framework would assist the Commission in framing future proceedings in a way that is most likely to be consistent with the IP networks, services, and applications of the future.

Although the Communications Act was not written with IP networks in mind, the Act nevertheless gives the Commission the authority to adapt its regulations to changes in telecommunications technology, at least in certain respects. For example, the FCC historically has interpreted sections 4(i) and 201-205[41] as providing broad authority to develop policies and rules to accommodate changes in telecommunications technology and competition, such as the *Computer Inquiries*. The Commission has also used its general preemption authority to ensure that national policies were not undermined by individual state actions. For example, the FCC determined that information services should not be regulated, and preempted state regulation of such services.[42] In addition, the 1996 amendments to the Act provide the Commission with additional authority, including the authority to forbear from applying provisions of the Act to telecommunications services (section 10),[43] and specific authority to preempt state and local regulations that act as barriers to entry (section 253).[44]

Step 3: Legislative Efforts

Although there is a great deal that the Commission can accomplish within the existing statutory framework, both the Communications Act of 1934 and other relevant

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[41] 47 U.S.C. §§ 154(i), 201-205.

[42] *See, e.g.*, *Pulver*, ¶¶ 15-25.

[43] 47 U.S.C. § 160.

[44] *Id.* § 253.

statutes, such as CALEA, may need to be amended to permit full implementation of a layers-based approach. The Act, for example, provides authority and direction for regulation of telecommunications carriers under Title II, and cable companies under Title VI. As the Internet Protocol is used more widely for all types of networks, this silos-based distinction between physical networks may make it cumbersome, if not impossible, for the FCC to develop a comprehensive set of policies. In particular, current law may hinder the Commission's ability to: (1) ensure that companies with market power are subject to economic regulation that prevents them from abusing that market power to affect competition for services or applications in higher layers; and (2) achieve social goals, including universal service and access for law enforcement. It would be helpful, therefore, for Congress to clarify the largely unregulated nature of IP-based services and applications, and amend the Act to remove the constraints imposed by the current silos-based Titles. Congress also could tailor the FCC's regulatory authority over bottleneck access platforms, such as DSL, and require the FCC to impose wholesale access requirements where market power exists. These legislative changes would enable the FCC to develop policies that are not driven by outdated concerns, such as whether an IP-based network utilizes spectrum obtained by a company that historically has built satellites, or utilizes copper or fiber deployed by a company that historically has built wireline telephone networks. In addition, it would be helpful for Congress to expand the FCC's forbearance authority in furtherance of the specific goal of ensuring that IP-based services are not subject to unnecessary or potentially harmful regulations.

If Congress takes up telecommunications legislation in the next few years, the Commission can render valuable assistance by providing Congress information regarding the fundamental changes caused by widespread use of the Internet Protocol. In particular, individual Members of Congress have stated that they wish to consider legislation to stabilize universal service funding. Congress may want to consider funding universal service through the application of a general tax, or by assessing contributions on a range of entities that currently do not have universal service funding obligations under section 254. Should Congress consider any of these changes, it will no doubt ask the FCC for technical support, and the FCC can provide assistance by explaining how networks have been transformed by the proliferation of the Internet Protocol, and the policy imperatives that flow from that transformation.

Conclusion

The move to IP-based networks has several implications for regulators. Specifically, the FCC should consider taking the following steps to ensure that regulations keep pace with the changes in the marketplace.

First step: In pending and future rulemakings, the FCC should use the layers framework as a tool to make policy decisions that are tailored to the manner in which technology and the market are developing.

Second step: The FCC should consider initiating a rulemaking proceeding to develop an overarching policy framework founded on the layers-based approach.

Third step: The FCC should provide technical support to Congress with respect to the formulation of any legislative changes that might be needed to ensure that regulation can keep pace with the changes in technology and the market.